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PROCESS FOR EXTRACTING SHELLFLOWER-CONTAINED COMPONENTS AND
SHELLFLOWER-DERIVED PRODUCTS PRODUCED THEREWITH
[Getto Naizo Seibun No Chushutu Hoho Oyobi Soreniyotte Tsukurareru
Getto Yurai Seihin]

Hiroyoshi Hamanaka

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INVENTOR	(72): HAMANAKA, HIROYOSHI
APPLICANTS	(71): EIKEN K.K.; IKEHARA, HIDEKATSU
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[Translator's note: Pages 2 to 5 were entirely replaced by the correction.]

[Claim 1] A process for extracting shellflower-contained components comprising: immersing the shellflower proper in a solution that is prepared by homogeneously dissolving or stably dispersing from 0.01 to 10 % by weight of a surfactant in water alone or in a mixture of water and a water-soluble solvent that can form a hydrogen bond with water and, at a temperature of from 10 to 150 °C, letting it stand in this condition or performing mixing, agitating, and shaking so as to bring them into mutual contact.

[Claim 2] A shellflower-derived product that is produced by the process for extracting shellflower-contained components stated in Claim 1, which comprises: immersing the shellflower proper in a solution that is prepared by homogeneously dissolving or stably dispersing from 0.01 to 10 % by weight of a surfactant in water alone or in a mixture of water and a water-soluble solvent that can form a hydrogen bond with water and, at a temperature of from 10 to 150 °C, letting it stand in this condition or performing mixing, agitating, and shaking so as to bring them into mutual contact.

[Claim 3] The shellflower-derived product stated in Claim 2, which is bed-bath water.

* Numbers in the margin indicate pagination in the foreign text.

[Claim 4] The shellflower-derived product stated in Claim 2, which is a beverage.

[Claim 5] The shellflower-derived product stated in Claim 2, which is a pest repellent.

[Claim 6] The shellflower-derived product stated in Claim 2, which is a bath agent.

[Detailed Description of the Invention]

[0001]

[Technical Field of the Invention] The present invention pertains to a process for extracting the components contained in the shellflower (scientific name: *Alpinia*), which is an aromatic plant, and to products thereof. More specifically, it pertains to an extraction process that brings the shellflower proper into contact with an aqueous micellar solution of a surfactant, thereby making it possible to efficiently extract the components contained in it and also to maintain the obtained extract homogeneously and uniformly in the solution, and it also pertains to shellflower-derived liquid products that are produced therewith.

[0002]

[Related Art] The shellflower, which is classified as Zingiberaceae *Alpinia* according to plant taxonomy, grows wild, with respect to Japan, in Okinawa, Minami Daitojima, Kita Daitojima, and so forth, and its leaf and stem parts contain large quantities of essential oil components, such as α -pinene and the like. Since these

components have excellent growth-inhibiting effects on food-poisoning bacteria and food spoilage bacteria, the plant as is has been used heretofore as food packaging materials, tatami flooring materials, building materials, and so forth. In recent years, however, various studies have been underway to create beverage products by immersing and, in some cases, heating the shellflower proper in water to leach out the components contained in it into water or to produce cosmetic products, such as bed-bath water, lotions, and so forth, by further adding hydrophilic moisturizing ingredients, surfactants, and so forth to the solution.

[0003]

[Problems that the Invention Intends to Solve] There is, however, a limit to the extent to which the internal components can be extracted by weakening the intermolecular force in the cellulose portion of the shellflower skeleton only by means of the Brownian motion of water molecules, and the aforesaid products also have no system that allows the water-insoluble essential oil components to remain stable in the liquid once extracted. Accordingly, in order to enhance the commercial value of solution-type products that are developed for deploying a new industry, there has been a need for the development and implementation of a more effective extraction process.

[0004] Under this circumstance, the present invention intends to provide an extraction process that can leach out the shellflower-contained components in larger quantities into an aqueous solution and

that can also sustain these components in a homogeneous and stable condition and also to provide shellflower-derived liquid products that are produced with this process.

[0005]

[Means For Solving The Problems] The present inventor conducted extensive research to achieve the aforesaid objectives and, as a result, learned that the shellflower-contained components could be extracted efficiently by immersing the shellflower proper, that is, /7 stems and/or leaves, in an aqueous solution in which a surfactant is homogeneously dissolved or stably dispersed in the form of micelles and by bringing the plant into contact with the solution at a temperature of 10 °C or higher but 150 °C or lower. Based on this finding, the present invention was achieved.

[0006] Namely, the present invention pertains to a process for extracting shellflower-contained components that comprises immersing the shellflower proper in a solution that is prepared by homogeneously dissolving or stably dispersing from 0.01 to 10 % by weight of a surfactant in water alone or in a mixture of water and a water-soluble solvent that can form a hydrogen bond with water and, at a temperature of from 10 to 150 °C, letting it stand in this condition or performing mixing, agitating, and shaking so as to bring them into mutual contact and also pertains to products obtained therewith.

[0007]

[Preferred Mode of the Invention] The following will explain a preferred mode of the present invention in detail. In the present invention, as the raw-material shellflower proper, its stem or leaf part or both parts may be used according to the application of the resulting product, and, here, the shellflower may be used directly in the form in which it is harvested as a raw material from a native region or may be physically ground into smaller pieces for use. The shellflower used here, as long as it is Zingiberaceae *Alpinia*, may be either *Alpinia speciosa* or *Alpinia uraiensis*, and the region of its origin is not a limiting factor, either.

[0008] In the present invention, raw material A, a surfactant, is not specifically limited, and anionic, nonionic, cationic, and amphoteric surfactants are all applicable to the present invention. Typical examples of the aforesaid anionic surfactant include alkylaryl sulfonates; soaps, such as sodium salts, potassium salts, triethanolamine salts, and the like of various kinds of fatty acids; sulfate salt acids [sic], such as alkyl sulfates, alkyl polyoxyalkylene ether sulfates, and the like; phosphate salts, such as alkyl phosphate salts, alkylaryl phosphate salts, alkyl polyoxyalkylene ether phosphate salts, alkylaryl polyoxyalkylene ether phosphate salts, and the like; and so forth. These may be used singly or in combination of two or more kinds.

[0009] Typical examples of the nonionic surfactant used herein include fatty acid esters, such as sorbitan fatty acid esters,

polyoxyethylene sorbitan fatty acid esters, glycerin fatty acid esters, diglycerin fatty acid esters, triglycerin fatty acid esters, tetraglycerin fatty acid esters, pentaglycerin fatty acid esters, hexaglycerin fatty acid esters, ethyleneglycol fatty acid esters, polyoxyethyleneglycol fatty acid esters, sucrose fatty acid esters, di(glycerin) borate fatty acid esters, and so forth; polyethers, such as alkyl polyoxyalkylene ethers, alkylaryl polyoxyalkylene ethers, polyoxyethylene glycol-polyoxypropylene glycol block copolymers, and the like; tertiary amines, such as N,N-di(polyoxyalkylene) alkylamine, N,N,N',N'-tetra(polyoxyalkylene) ethylene diamine, and the like; amides, such as fatty acid monoalkylolamide, fatty acid dialkylolamide, and the like; and so forth. These may be used singly or in combination of two or more kinds.

[0010] Typical examples of the cationic surfactant used herein include quaternary ammonium salts, such as tetraalkyl ammonium salts, trialkyl(β -hydroxyalkyl) ammonium salts, dialkyl di(polyoxyalkylene) ammonium salts, and the like. These may be used singly or in combination of two or more kinds. Typical examples of the amphoteric surfactant used herein include betaines, such as trialkyl betaine, alkyl imidazoline betaine, and the like; phospholipids, such as lecithin and the like; and so forth. These may be used singly or in combination of two or more kinds.

[0011] In the present invention, as raw material B, water alone or a mixture of water and a water-soluble solvent that can form a

hydrogen bond with water is used. Examples of the water-soluble solvent used herein that can form a hydrogen bond with water include alcoholic solvents, such as methyl alcohol, ethyl alcohol, n-propyl alcohol, isopropyl alcohol, ethylene glycol, diethylene glycol, propylene glycol, dipropylene glycol, 1,3-butylene glycol, glycerin, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol monopropyl ether, ethylene glycol monoisopropyl ether, ethylene glycol monobutyl ether, diethylene glycol monomethyl ether, diethylene glycol monoethyl ether, diethylene glycol monopropyl ether, diethylene glycol monoisopropyl ether, diethylene glycol monobutyl ether, propylene glycol monomethyl ether, propylene glycol monoethyl ether, propylene glycol monopropyl ether, propylene glycol monoisopropyl ether, propylene glycol monobutyl ether, dipropylene glycol monomethyl ether, dipropylene glycol monoethyl ether, dipropylene glycol monopropyl ether, dipropylene glycol monoisopropyl ether, dipropylene glycol monobutyl ether, and the like; ether solvents, such as ethylene glycol dimethyl ether, ethylene glycol diethyl ether, diethylene glycol dimethyl ether, diethylene glycol diethyl ether, furfural, dioxane, and the like; ketone solvents, such as acetone, methyl ethyl ketone, and the like; nitrogen-containing solvents, such as 2-methyl imidazolidinone and the like; and so forth. These water-soluble solvents may be used singly or in combination of two or more kinds.

[0012] The following will give a detailed account of the present /8

invention's process for extracting shellflower-contained components. First, an extraction liquid composed of raw material A and raw material B is prepared by feeding raw material A into raw material B in such a feed proportion as to set the solution concentration to from 0.01 to 10 % by weight and subsequently by mixing them at room temperature or while heating the mixture. If the solution concentration here is below 0.01 % by weight, it could become lower than the critical micelle concentration (CMC), and the solution may not function for promoting the extraction of the shellflower-contained components, while a solution concentration exceeding 10 % by weight causes the viscosity of the resulting solution to increase dramatically, thereby interfering with the contact with raw material C, the shellflower proper, thus rendering both concentration ranges undesirable. Here, the solution concentration of the extraction liquid is preferably from 0.1 to 5 % by weight, best of all, from 1 to 3 % by weight.

[0013] In the subsequent immersion of raw material C into the aforesaid extraction liquid, the feed proportions between these materials can be selected freely, but, for the purpose of conducting the extraction process of the present invention more efficiently, the processing temperature is preferably from 10 to 150 °C. An internal temperature of below 10 °C weakens the extraction action of surfactant micelles, while an internal temperature exceeding 150 °C could cause the evaporation and decomposition of the shellflower-contained

components proper, thus rendering both temperature ranges undesirable. Here, the extraction temperature is preferably from 25 to 125 °C, best of all, from 50 to 100 °C.

[0014] The extraction operation comprises allowing a composition that is composed of raw materials A, B, and C to be left to stand as is under the aforesaid temperature condition or mixing these raw materials actively and bringing them into contact with one another with the use of a separate agitating or shaking apparatus. Normally, the extraction liquid can exert its extracting function sufficiently under ordinary pressure, but, for the purpose of reducing the possibility of the extracted components' decomposition or for the purpose of further increasing the extraction efficiency, the extraction operation may be carried out under a pressurized condition, depending on the case.

[0015] With respect to the present invention's extraction process of components contained in the shellflower and shellflower-derived liquid products, in addition to using the liquid and all found at the end of the extraction operation as a product, the shellflower residue may be eliminated from the liquid after the extraction operation, and the thus obtained liquid containing shellflower-contained components may be provided as a product. Because the shellflower components extracted by the extraction process of the present invention are kept in an extremely stable condition in the extraction solution by the action of the surfactant micelles and also transferred smoothly, they

lead to the production of shellflower-derived products having further improved performance in the fields of cosmetics, beverages, water-treatment agents, sundry articles for daily life, and so forth.

[0016]

[Working Example 1] In an airtight reactor equipped with an agitator, thermometer, and heating device were charged an extraction liquid that was composed of 1 part by weight tetraglycerin monolaurate, 10 parts by weight water, and 89 parts by weight glycerin and 20 parts by weight of the stem parts (which were formed into small pieces 5 cm long on average) of shellflower grown on the main island of Okinawa, and the content was rotated and agitated at a speed of 1500 rpm at 90 °C for 1 hour, thereby implementing grinding and extraction. Thereafter, the content was filtered at the same temperature under normal pressure with No. 2 filter paper, thereby collecting a translucent, pale orange filtrate; thus, a shellflower-derived liquid product was obtained.

[0017] A solution was prepared by dissolving 50 mg of this shellflower-derived liquid product in 100 ml methyl alcohol, and this as a sample was subjected to a UV absorption spectral analysis. The result is shown in Fig. 1.

[0018] Comparative Example 1

Into a similar reactor as the one used in Working Example 1 were charged 10 parts by weight water, 90 parts by weight glycerin, and 20 parts by weight of the stem parts (which were formed into small pieces

5 cm long on average) of shellflower grown on the main island of Okinawa, and, as in Working Example 1, the content was rotated and agitated at a speed of 1500 rpm at 90 °C for 1 hour, thereby implementing grinding and extraction, after which the content was filtered at the same temperature under normal pressure with No. 2 filter paper, thereby collecting a transparent, slightly orange filtrate; thus, a shellflower-derived liquid product for comparison use was obtained. With this shellflower-derived liquid product, a UV absorption spectral analysis was conducted in the same manner as in Working Example 1. The result is shown in Fig. 1.

[0019] As is evident from Fig. 1, the absorbance in the UV absorption spectrum exhibited by the shellflower-derived liquid product of Working Example 1, which was prepared by the extraction process of the present invention, was stronger than that of the shellflower-derived liquid product of Comparative Example 1. This confirmed that the process of the present invention had the advantage of extracting more shellflower-contained components, which are useful essential oil compounds, by means of the micellar catalytic system.

[0020]

[Working Example 2] Into a stoppered Erlenmeyer flask having an air-cooled tube connected to the upper portion thereof, 0.25 part by weight sucrose monolaurate and 99.75 parts by weight water were charged and formed into a homogeneous dispersion, to which was then added 3 parts by weight of the dried leaf parts (in the form of 50-

mesh particles having a 2 % moisture content) of shellflower grown on the main island of Okinawa, and extraction was carried out for 30 minutes while the content was being heated and refluxed at 95 to 100 °C and shaken. Thereafter, the internal temperature was decreased to 60 °C, and the content was filtered under normal pressure with No. 2 filter paper, thereby collecting a translucent, reddish orange filtrate; thus, a shellflower-derived liquid product was obtained.

[0021] A UV absorption spectral analysis was carried out on a sample prepared by dissolving 50 mg of this shellflower-derived liquid product in 100 ml methyl alcohol, as in Working Example 1. The result is shown in Fig. 2.

[0022] Comparative Example 2

In a similar heating, evaporating, and shaking apparatus as the one used in Working Example 2 were charged 100 parts water and 3 parts of the dried leaf parts of shellflower grown on the main island of Okinawa (in the form of 50-mesh particles having a 2 % moisture content), and, in the same manner as in Working Example 2, shaking and extraction were carried out at 95 to 100 °C for 30 minutes, after which the content was filtered at 60 °C under normal pressure with No. 2 filter paper, thereby collecting a transparent, reddish orange filtrate; thus, a shellflower-derived liquid product for comparison use was obtained. With this shellflower-derived liquid product, a UV absorption spectral analysis was conducted in the same manner as in Working Example 2. The result is shown in Fig. 2.

[0023] As is evident from Fig. 2, the absorbance in the UV absorption spectrum exhibited by the shellflower-derived liquid product of Working Example 2 was stronger than that of the shellflower-derived liquid product of Comparative Example 2, which fact confirmed that the process of the present invention extracted the target useful essential oil compounds in larger quantities.

[0024]

[Working Examples 3 through 8] Using raw materials A, B, and C /9 of the kinds and in quantities shown in Tables 1 and 2 below, operations for extracting shellflower-contained components were performed in the same manner as in Working Example 1 or 2.

[Table 1]

表例(D)	(A)原料	(B)原料	(C)原料	抽出方法(E)
1	(a)ペンタグリセリンモノオレート 0.8重量部 (b)ソルビタンモノラウレート 0.2重量部	水(h) エチルアルコール(i)	80重量部(n) 1.25重量部(n)	抽出方法(1)(2) 抽出方法(3)
4	レシチン(c)	水(h) グリセリン(j) プロピレングリコール(k)	10重量部(n) 80重量部(n) 0.10重量部(n)	抽出方法(1)(2) 抽出方法(3)
6	ポリ(8)オキソエチレンオクチルフェニルエーテル(d) ポリ(10)オキソエチレンセチルエーテル(e) ポリ(8)オキソエチレンオクチルフェニルエーテル(f)	水(h) 1,3-ブチレングリコール(l) ジプロピレングリコール(m) モノメチルグリセリン(n)	80重量部(n) 10重量部(n) 10重量部(n) 10重量部(n)	抽出方法(1)(2) 抽出方法(3)
8	ポリ(8)オキソエチレンセチルエーテル(g) ポリ(10)オキソエチレンセチルエーテル(h) ポリ(8)オキソエチレンオクチルフェニルエーテル(i)	水(h) エチルアルコール(j) グリセリン(k)	80重量部(n) 10重量部(n) 10重量部(n)	抽出方法(1)(2) 抽出方法(3)

Key: A, B, C) raw material; D) working example; E) extraction method; a) pentaglycerin monooleate; b) sorbitan monolaurate; c) lecithin; d) sodium oleate; e) poly(8) oxyethylene octyl phenyl ether; f) lauryl diethanolamine; g) poly(10) oxyethylene cetyl ether ammonium phosphate; h) water; i) ethyl alcohol; j) glycerin; k) propylene glycol; l) 1,3-butylene glycol; m) dipropylene glycol monomethyl ether; n) parts by weight; o) stem and leaf parts of *Alpinia uraiensis* (grown on Minami Daitojima); p) stem parts of *Alpinia uraiensis* (grown on Kita Daitojima); q) stem parts of *Alpinia speciosa* (grown on the

main island of Okinawa); r) stem and leaf parts of *Alpinia speciosa* (grown on the main island of Okinawa); s) in accordance with the extraction process in Working Example 2 (100 °C, 5 hours); t) in accordance with the extraction process in Working Example 1 (150 °C, 2 hours); u) the same as above (60 °C, 2 hours); v) in accordance with the extraction process in Working Example 1 (under application of 3 kg/cm² pressure, 90 °C, 1 hour)

[Table 2]

歩合例(D)	(A)原料	(B)原料	(C)原料	抽出方法(E)
1	ジオクタデシルヘキサメチルアンモニウム・クロリド (a) (o): 液量部	水 (g) (o): 液量部 グリセリン (h) (o): 液量部 1,3-ブチレングリコール (i) (o): 液量部	月桃(幹葉)の抽出液 (k) (o) 茎部 (l) (o)	月桃(幹葉)の抽出液 (m) (n)
2	ジエチルヘキサノールモノステアレート (b) (o): 液量部	エーテル (j) (o): 液量部	大島龍(南大島産)の抽出液 (l) (o)	大島龍(南大島産)の抽出液 (m) (n)
3	サレチルヘキサノールモノステアレート (c) (o): 液量部	エーテル (j) (o): 液量部	大島龍(南大島産)の抽出液 (l) (o)	大島龍(南大島産)の抽出液 (m) (n)
4	グリセリンモノステアレート (d) (o): 液量部	エーテル (j) (o): 液量部	大島龍(南大島産)の抽出液 (l) (o)	大島龍(南大島産)の抽出液 (m) (n)
5	シメン-モノステアレート (e) (o): 液量部	エーテル (j) (o): 液量部	大島龍(南大島産)の抽出液 (l) (o)	大島龍(南大島産)の抽出液 (m) (n)
6	N-メチルウンデシルイミダゾリンベタイン (f) (o): 液量部	水 (g) (o): 液量部	大島龍(南大島産)の抽出液 (l) (o)	大島龍(南大島産)の抽出液 (m) (n)

Key: A, B, C) raw material; D) working example; E) extraction method; a) dioctadecyl dimethyl ammonium chloride; b) propylene glycol monostearate; c) oleyl diethanolamide; d) glycerin monolaurate; e) sucrose monostearate; f) N-methyl undecyl imidazoline betaine; g) water, h) glycerin; i) 1,3-butylene glycol; j) ethylene glycol monoethyl ether; k) stem parts of *Alpinia speciosa* (grown on the main island of Okinawa); l) stem parts of *Alpinia uraiensis* (grown on Minami Daitojima); m) in accordance with the extraction process in Working Example 1 (115 °C, 1 hour); n) in accordance with the extraction process in Working Example 2 (10 °C, left standing for 100 hours); o) parts by weight

[0025] Application Example 1

Ten kinds of bed-bath water preparations were prepared by individually diluting 10 g of the shellflower-derived liquid products obtained by the extraction operations performed in Working Examples 1 through 8 and Comparative Examples 1 and 2 in 90 g refined water. Next, 100 males and females from 20 to 60 years old were randomly selected as the subjects, and samples were prepared by spraying 30 cm x 30 cm

white cotton towels (each weighing 22 g) with 10 g of each kind of the aforesaid bed-bath water preparation. Ten subjects per one kind of sample were asked to wipe their faces after arriving home.

[0026] Table 3 below shows the results of the panel test, which confirmed that the bed-bath water preparations that had, as the base, the shellflower-derived liquid products obtained by the extraction process of the present invention were superior both in sensory aspect and practical aspect and were more effective as cosmetic products. This result also suggests the utility of the shellflower-derived liquid products obtained by the extraction process of the present invention as a bath agent.

Note) *1 The evaluation criteria for stain elimination were as follows.

⊙: Ten subjects all thought that the sample cleaned stains off the face well.

○: Seven to nine subjects among ten subjects thought that the sample cleaned stains off the face well.

△: Six or fewer subjects among 10 subjects thought that the sample cleaned stains off the face well.

*2 The evaluation criteria for the skin condition after the treatment were as follows.

A: Ten subjects all felt that the sample was non-irritating and made the skin smooth.

B: Among ten subjects, seven to nine subjects felt that the sample made the skin smooth and one to three subjects felt that it was irritating.

C: Among ten subjects, 6 or fewer subjects felt that the sample made the skin smooth.

*3 The evaluation criteria for olfactory sensation were as follows. /10

⊙: Ten subjects all smelled a pleasant odor.

○: Among ten subjects, seven to nine subjects smelled a pleasant odor.

△: Among ten subjects, six or fewer subjects smelled a pleasant odor.

[Table 3]

試験液試水 {a}	※1 汚れ除去性	※2 処理後の肌具合	※3 臭い感
実例1の月経床浴液 製品を水希釈したもの {b}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {c}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {d}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {e}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {f}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {g}	⊙	A	⊙
〇 〇 〇 を希釈したもの {h}	⊙	A	⊙
〇 〇 〇 を水希釈したもの {i}	⊙	A	⊙
実例1の月経床浴液 製品を水希釈したもの {j}	△	B	△
〇 〇 〇 を水希釈したもの {k}	△	C	C

Key: *1) stain elimination effect; *2) skin condition after the treatment; *3) olfactory sensation; a) test bed-bath water preparation; b) the shellflower-derived liquid product of Working Example 1 diluted with water; c) the shellflower-derived liquid product of Working Example 2 diluted with water; d) the shellflower-derived liquid product of Working Example 3 diluted with water; e) the shellflower-derived liquid product of Working Example 4 diluted with water; f) the shellflower-derived liquid product of Working Example 5

diluted with water; g) the shellflower-derived liquid product of Working Example 6 diluted with water; h) the shellflower-derived liquid product of Working Example 7 diluted with water; i) the shellflower-derived liquid product of Working Example 8 diluted with water; j) the shellflower-derived liquid product of Comparative Example 1 diluted with water; k) the shellflower-derived liquid product of Comparative Example 2 diluted with water

[0027] Application Example 2

Rayon unwoven cloth (a product of Daiwabo Co.) pieces 13 cm x 21 cm in size were impregnated each with 2 g of one of the shellflower-derived liquid products obtained in Working Examples 1 through 8 and Comparative Examples 1 and 2, thereby preparing three hundred sample sheets for each type of product. Next, 100 households having from 3 to 6 family members were randomly selected as the subject households. Ten households per one kind of test sample were asked to keep a sample sheet in a sink-corner strainer placed at the kitchen sink and to replace it at a rate of one sheet per day after every dinner for 30 days in summer.

[0028] Table 4 below shows the results of the panel test, and it was observed that, in the kitchens in which were placed the nonwoven cloth sheets impregnated with the shellflower-derived liquid products obtained by the extraction process of the present invention, noxious insects were rarely found; thus, the present invention had the advantage of creating a sanitary atmosphere well.

Note) *1 The evaluation criteria for the cockroach elimination effect were as follows.

⊙: In all of the ten test-subject households, cockroaches were not seen at all during the 30-day period.

○: In seven to nine of the ten test-subject households, cockroaches were not seen at all during the 30-day period.

△: In four to six of the ten test-subject households, cockroaches were not seen at all during the 30-day period.

X: In three or fewer of the ten test-subject households, cockroaches were not seen at all during the 30-day period.

*2 The evaluation criteria for the fruit-fly elimination effect were as follows.

⊙: In all of the ten test-subject households, fruit flies were not seen at all in their kitchens during the 30-day period.

○: In seven to nine of the ten test-subject households, fruit flies were not seen at all in their kitchens during the 30-day period.

△: In four to six of the ten test-subject households, fruit flies were not seen at all in their kitchens during the 30-day period.

X: In three or fewer of the ten test-subject households, fruit flies were not seen at all in their kitchens during the 30-day period.

[Table 4]

/11

試 験 作 (a)	第1 コキブリ駆除効果	第2 ショウジョウバエ駆除効果
表2例1の丹頭由来液を浸透させた不織布 (b)	◎	◎
A 2 5 非食餌由来の不織布 (c)	◎	◎
A 3 2 非食餌由来の不織布 (d)	◎	◎
A 5 4 非食餌由来の不織布 (e)	○	◎
A 5 8 非食餌由来の不織布 (f)	◎	◎
A 6 7 非食餌由来の不織布 (g)	◎	◎
A 7 4 非食餌由来の不織布 (h)	◎	◎
A 8 4 非食餌由来の不織布 (i)	◎	○
比較例1の丹頭由来液を浸透させた不織布 (j)	△	×
A 12 8 非食餌由来の不織布 (k)	×	△

Key: *1) cockroach elimination effect; *2) fruit fly elimination effect; a) test sample; b) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 1; c) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 2; d) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 3; e) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 4; f) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 5; g) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 6; h) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 7; i) nonwoven cloth impregnated with the shellflower-derived liquid product of Working Example 8; j) nonwoven cloth impregnated with the shellflower-derived liquid product of Comparative Example 1; k) nonwoven cloth impregnated with the shellflower-derived liquid product of Comparative Example 2

[0029] Application Example 3

Sixty females who were suffering from constipation were randomly selected from females 15 to 45 years old as the subjects. The shellflower-derived liquid products obtained by the extraction

operations conducted in Working Examples 1 to 4 and Comparative Examples 1 and 2 were taken by ten subjects per one kind of product twice daily (at 8 AM and 10 PM) for 15 days by adding 5 g of each product to 100 ml water.

[0030] Table 5 below shows the results of the panel test, and it was confirmed that, when the shellflower-derived liquid products obtained by the extraction process of the present invention were formed into beverages that were intended to serve as dietary supplements, they produced better physical effects and were also more beneficial to mental health.

Note) *1 The evaluation criteria for changes in the physical condition were as follows.

⊙: Ten subjects all felt that their constipation symptom was alleviated.

○: Seven to nine out of ten subjects felt that their constipation symptom was alleviated.

△: Six or fewer out of ten subjects felt that their constipation symptom was alleviated.

*2 The evaluation criteria for changes in mood were as follows.

A: Ten subjects all felt calmer after drinking the sample beverage.

B: Seven to nine out of ten subjects felt calmer after drinking the sample beverage.

C: Six or fewer out of ten subjects felt calmer after drinking the sample beverage.

[Table 5]

/12

(a) 試料飲料	表1	
	抽出の状況	成分の濃度
実例1の月桂油抽出液製品を希釈した飲料 (b)	◎	A
※ 2 ※		
を希釈した飲料 (c)	◎	A
※ 3 ※		
を希釈した飲料 (d)	◎	A
※ 4 ※		
を希釈した飲料 (e)	◎	A
比較例1の月桂油抽出液製品を希釈した飲料 (f)	△	B
※ 5 ※		
を希釈した飲料 (g)	△	B

Key: *1) change in physical condition; *2) change in mood; a) sample beverage; b) beverage prepared by diluting the shellflower-derived liquid product of Working Example 1; c) beverage prepared by diluting the shellflower-derived liquid product of Working Example 2; d) beverage prepared by diluting the shellflower-derived liquid product of Working Example 3; e) beverage prepared by diluting the shellflower-derived liquid product of Working Example 4; f) beverage prepared by diluting the shellflower-derived liquid product of Comparative Example 1; g) beverage prepared by diluting the shellflower-derived liquid product of Comparative Example 2

[0031]

[Effects of the Invention] Heretofore, the shellflower has been used by extracting part of its components by a water treatment, but the present invention causes a micellar catalytic system to act on the cellulose portion of the shellflower proper, thereby improving the extraction efficiency of the shellflower-contained components and also making it possible to keep the extracted components in a solubilized state stably in the extraction liquid. Therefore, by implementing the present invention, it becomes possible to manufacture products that more prominently exhibit the bioactive effects that the shellflower

possesses and also to provide products that do not alter their physical states even when subjected to long-term storage or transportation. Furthermore, not limited to the production process of products, the application of the present invention to the cutting and grinding processes of the shellflower proper yields, together with the rebinder effect, processed shellflower that is impregnated with the extraction liquid to a higher degree. Consequently, in the case of using the processed shellflower as is as products, such as tea, bath agents, and so forth, the extraction operation of the present invention may be caused to start working at the time in which these products are brought into contact with warm or hot water; thus, the present invention opens up a way to produce functional products that have not been seen to date and contributes greatly to the diversification of shellflower-derived products.

[Brief Explanation of the Drawings]

[Fig. 1] A graph that shows the UV absorption spectra of a methyl alcohol-diluted solution of the shellflower-derived liquid product obtained in Working Example 1 and a methyl alcohol-diluted solution of the shellflower-derived liquid product obtained in Comparative Example 1.

[Fig. 2] A graph that shows the UV absorption spectra of a methyl alcohol-diluted solution of the shellflower-derived liquid product obtained in Working Example 2 and a methyl alcohol-diluted solution of

the shellflower-derived liquid product obtained in Comparative Example 2.

[Explanation of Reference Numerals]

1: UV absorption spectrum of the shellflower-derived liquid product obtained in Working Example 1.

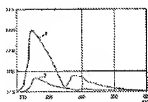
2: UV absorption spectrum of the shellflower-derived liquid product obtained in Comparative Example 1.

3: UV absorption spectrum of the shellflower-derived liquid product obtained in Working Example 2.

4: UV absorption spectrum of the shellflower-derived liquid product obtained in Comparative Example 2.

/6

[FIG. 1]



[FIG. 2]

